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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,486	03/12/2004	Timothy Graham Bradley	BLD920040003US1	8390

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DUFT BORNSSEN & FISHMAN, LLP
1526 SPRUCE STREET
SUITE 302
BOULDER, CO 80302

EXAMINER

UHLENHAKE, JASON S

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2853

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/799,486	Applicant(s) BRADLEY, TIMOTHY GRAHAM	
	Examiner JASON S. UHLENHAK	Art Unit 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,8-14,17,18 and 23-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-4, 8-14, 17-18, 23-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 8-11, 13, 17, 20, 23-25, 27, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) in view of Kimura (U.S. Pub. 2002/0126167) and Murakami et al (U.S. Pat. 6,158,844)

Gundlach discloses:

- ***regarding claim 1***, an apparatus for electrorheological printing, the apparatus comprising: an electrode arrangement configured to create an electric field to control a rate of discharge of the electrorheological ink through the nozzle, wherein the electrode arrangement is further configured to create an electric field with a magnitude sufficient to stop the discharge of the electrorheological ink through the nozzle and configured to create an electric field with lower magnitude to permit electrorheological ink to discharge through the nozzle (Figures 2-3; Abstract; Column 5, Lines 24-40)
- prevent the discharge of the electrorheological ink through the nozzle when the electric field created within the nozzle is greater than or equal to the first magnitude electric field (Abstract)

- **regarding claim 8**, a plurality of nozzles forming a nozzle array and the electrode arrangement is one of a plurality of electrode arrangements, each electrode arrangement disposed to control a flow of the electrorheological ink at one of the plurality of nozzles (Column 3, Lines 59-65; Column 4, Lines 30-32)
- **regarding claim 9**, the flow of the electrorheological ink at each nozzle of the nozzle array is independently controlled (Column 3, Lines 59-65; Column 4, Lines 30-32)
- **regarding claim 10**, a print control module configured to receive a print signal; a synchronization signal module configured to control the synchronization signal generated by the stimulator; an electrode control module configured to synchronize a voltage level at the electrode arrangement with the synchronization signal and the print signal (Figures 2-3; Abstract; Column 5, Lines 24-40)
- **regarding claims 11, 24**, control module configured to de-energized the electrode arrangement about when the synchronization signal and the print signal are enabled (Column 5, Lines 24-40)
- **regarding claim 13**, a viscosity control module configured to control the viscosity of the electrorheological ink as the electrorheological ink discharges from the nozzle (Column 5, Lines 24-40)
- **regarding claim 17**, computer readable storage medium comprising computer readable code configured to carry out a method for electrorheological printing, comprising; creating an electric field in an electrode arrangement to control a rate of discharge of the electrorheological ink through the nozzle, wherein the electrode

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arrangement is further configured to create an electric field having a magnitude sufficient to stop the discharge of the electrorheological ink through the nozzle and to create an electric field having a lesser magnitude to permit electrorheological ink to discharge through the nozzle (Figures 2-3; Abstract; Column 5, Lines 24-40)

- **regarding claim 20**, wherein controlling the flow of the electrorheological ink at the nozzle comprises changing the viscosity of the electrorheological ink (Column 5, Lines 24-40)

- **regarding claim 23**, discharging a drop of the electrorheological ink from the nozzle (Column 3, Lines 59-65)

- **regarding claim 25**, method further comprises receiving a print signal (Abstract; Column 3, Lines 30-40)

- **regarding claim 27**, controlling the viscosity of the electrorheological ink as the electrorheological ink discharges from the nozzle (Column 5, Lines 24-40)

- **regarding claim 29**, a method for electrorheological printing, comprising: creating an electric field in an electrode arrangement to control a rate of discharge of the electrorheological ink through the nozzle, wherein the electrode arrangement is further configured to create an electric field having a magnitude sufficient to stop the discharge of the electrorheological ink through the nozzle and to create an electric field having a lesser magnitude to permit electrorheological ink to discharge through the nozzle (Figures 2-3; Abstract; Column 5, Lines 24-40)

Gundlach does not disclose expressly the following:

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- **regarding claims 1, 17, 29**, a pressurized ink chamber configured to contain ink, the pressurized ink chamber in fluid communication with a nozzle; a stimulator configured to generate a synchronization signal to increase the pressure in the pressurized ink chamber, wherein the increased pressure within the pressurized ink chamber caused the electrorheological ink to discharge through the nozzle

- a first circular electrode at an inlet to the nozzle and a second circular electrode at an outlet of the nozzle; a pair of conductive plates aligned in parallel with a path of the electrorheological ink from the outlet of the nozzle to modify the path of the electrorheological ink from the outlet of the nozzle

- **regarding claim 3**, the first ring electrode is connected to a first electrical lead and the second ring electrode is connected to a second electrical lead

Kimura discloses:

- **regarding claims 1, 17, 29**, a pressurized ink chamber configured to contain ink, the pressurized ink chamber in fluid communication with a nozzle; a stimulator configured to generate a synchronization signal to increase the pressure in the pressurized ink chamber, wherein the increased pressure within the pressurized ink chamber caused the ink to discharge through the nozzle (Abstract; Paragraphs 0004, 0038)

Murakami discloses:

- **regarding claims 1, 17, 29**, a first circular electrode (15) at an inlet to the nozzle and a second circular electrode (16) at an outlet of the nozzle; a pair of conductive plates (the guide member 50 includes a pair of plates 56A, 56B through

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which the ink droplet is projected) aligned in parallel with a path of the electrorheological ink (Figures 73-74) from the outlet of the nozzle to modify the path of the electrorheological ink from the outlet of the nozzle (Figures 21, 24-25; Column 24, Lines 27-33; Column 42, Lines 29-44). Different embodiments of Murakami are disclosed, however it would be obvious to a person of ordinary skill in the art to incorporate the different embodiments (ink guide made of conductive materials; and a pair of control electrodes), for the purpose of improving the stability of the ink emitting direction.

- **regarding claim 3**, the first ring electrode (15) is connected to a first electrical lead and the second ring electrode (16) is connected to a second electrical lead (Figures 21, 25)

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Kimura and Murakami into the device of Gundlach, for the purpose of driving an ink jet type recording head, which can obtain a sufficient ink droplet discharge velocity; easily emitting ink through the nozzle and guide portion and improving the stability of the ink emitting direction.

Claims 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) as modified by Kimura (U.S. Pub. 2002/0126167) and Murakami et al (U.S. Pat. 6,158,844) as applied to claim 1 above, and further in view of Takahashi (U.S. Pat. 6,695,439)

Gundlach as modified by Kimura and Murakami discloses all the claimed limitations above except for the following:

- **regarding claim 4**, the first electrical lead is connected to a reference voltage and the second electrical lead is connected to a power supply, the power supply configured to supply a voltage that is different from the reference voltage

Takahashi discloses:

- **regarding claim 4**, the first electrical lead is connected to a reference voltage (ground) and the second electrical lead is connected to a power supply, the power supply configured to supply a voltage that is different from the reference voltage (Figures 31-34; Column 23, Lines 7-15; Lines 41-56), for the purpose of obtaining a desired a large amount of deformation even with a small number of electrodes

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Takahashi into the device of Gundlach as modified by Kimura and Murakami, for the purpose of obtaining a desired a large amount of deformation even with a small number of electrodes

Claims 12, 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) as modified by Kimura (U.S. Pub. 2002/0126167) and Murakami et al (U.S. Pat. 6,158,844) as applied to claims 1 and 17 above, and further in view of Howkins et al (U.S. Pat. 6,932,458)

Gundlach as modified by Kimura and Murakami discloses all of the claimed limitations except for the following:

- **regarding claim 12, claim 26**, a pump control module configured to control a pump to control the pressure in the pressurized ink chamber

Howkins discloses:

- ***regarding claim 12, claim 26***, a pump control module configured to control a pump to control the pressure in the pressurized ink chamber (Column 6, Lines 27-67)

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Howkins into the device Gundlach as modified by Kimura and Murakami, for the purpose of improving the performance of ink jet print heads in high frequency usage conditions

Claims 14, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) as modified by Kimura (U.S. Pub. 2002/0126167) and Murakami et al (U.S. Pat. 6,158,844) as applied to claims 1 and 17 above, and further in view of Mutou (U.S. Pat. 5,227,814)

Gundlach as modified by Kimura and Murakami discloses all of the claimed limitations except for the following:

- ***regarding claim 14, claim 28***, a media compensation module configured to modify the voltage level at the electrode arrangement to compensate for the variation in a speed of a print media on which the electrorheological ink is being printed

Mutou discloses:

- ***regarding claim 14, claim 28***, a media compensation module configured to modify the voltage level at the electrode arrangement to compensate for the variation

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in a speed of a print media on which the electrorheological ink is being printed (Column 5, Lines 30 – 48), for the purpose of shortening recording time.

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Mutou into the device of Gundlach as modified by Kimura and Murakami, for the purpose of shortening recording time.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) as modified by Kimura (U.S. Pub. 2002/0126167) and Murakami et al (U.S. Pat. 6,158,844) as applied to claim 17 above, and further in view of Minemoto et al (U.S. Pat. 6,224,193)

Gundlach as modified by Kimura and Murakami does not disclose expressly the following:

- ***regarding claim 18***, creating an electric field comprises creating voltage difference between a first electrode and a second electrode

Minemoto et al discloses:

- ***regarding claim 18***, creating an electric field comprises creating voltage difference between a first electrode and a second electrode (Column 4, Lines 19-33),

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Minemoto et al into the device of Gundlach as modified by Kimura and Murakami, for the purpose of ejecting from an ejection electrode with reliability and stability.

Response to Arguments

Applicant's arguments with respect to claims 1, 3-4, 8-14, 17-18, 23-29 have been considered but are moot in view of the new ground(s) of rejection. Murakami et al discloses a first circular electrode at an inlet to a nozzle; a second circular electrode at an outlet of a nozzle and a pair of conductive plated aligned in parallel with a path of the electrorheological ink. Kimura discloses a pressure chamber and stimulator for the purpose of obtaining a sufficient ink droplet discharge velocity even if an applied voltage is low. The combination of Gundlach et al (U.S. Pat. 6,048,050) in view of Kimura (U.S. Pub. 2002/0126167) and Murakami et al (U.S. Pat. 6,158,844) discloses all of the claimed limitations, please see the above rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON S. UHLENHAKKE whose telephone number is (571)272-5916. The examiner can normally be reached on Monday-Friday 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JASON S UHLENHAKKE/
Examiner, Art Unit 2853
December 12, 2008

/Julian D. Huffman/
Primary Examiner, Art Unit 2853